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STREAM PIRACY AND NATURAL BRIDGES IN THE LOESS OF SOUTHEAST MISSOURI

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In Perry and Cape Girardeau counties, in southeastern Missouri, are loess deposits locally deeply gullied into a sort of rather mild badland topography. During the field season of 1913, the writer observed in this gullied loess an unusual combination of erosion phenomena, which illustrates in miniature one process of formation of natural bridges.¹

Along a roadside a gully had cut into the loess to a depth of over six feet, and, owing to a filling of bowlders and débris at its lower end, had established a temporary base level. The tributary gullies were also near this base level, and during a recent storm had actively widened their valleys.

At a distance of perhaps ten feet from the junction of the main gully and a tributary, undercutting of the banks in opposing directions had reduced the divide at that point to a wall of loess not more than fifteen inches thick, the upper grassy portion of which had crumbled away, lowering the divide a foot or two, at the narrowest place, and forming a sort of saddle.

The bed of the larger ditch was ten or twelve inches lower than that of its neighbor, and, in continually wearing against the loess wall, had completely undercut the divide, opening a gap about a foot high by eighteen inches long, leaving a natural bridge of loess, with an open arch between the two gullies.

The further undercutting of the larger channel had so encroached upon its smaller and higher neighbor as completely to divert the drainage of the latter through the arch, over a low rapids, leaving the lower course of the beheaded gully several inches higher than its former upper course, with a distinct step between them. The

¹H. F. Cleland, "North American Natural Bridges, with a Discussion of Their Origin," *Bull. Geol. Soc. America*, XXI (1910), 313-38.

increased gradient of the diverted portion had caused it to intrench itself slightly in the bed of its old course.

The case illustrates both stream piracy and the formation of natural bridges by lateral erosion. The writer observed two other smaller bridges formed in the same way. In the two latter cases, however, drainage was not diverted. Several cases were noted in which the undercutting was nearly complete.

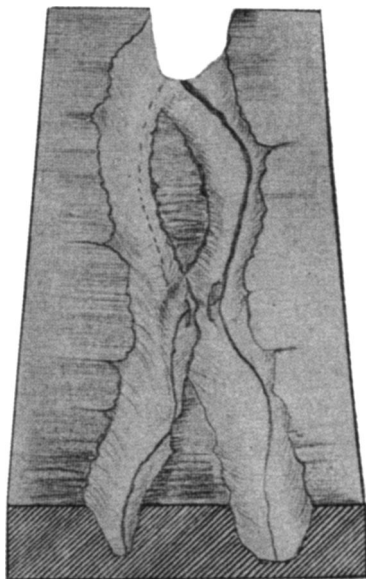


FIG. 1

At the time the writer observed the foregoing features all the gullies were dry. One living in a region of loess or badland formations subject to rapid local erosion could doubtless study these features in actual process of formation during any heavy shower.

Fig. 1 is a rough sketch, showing the general features described in the foregoing material.